CLAIMS

1. A method for producing doped boron comprising the steps of:

introducing a boron containing vapor into a reaction vessel;

introducing a dopant vapor into the vessel to provide a mixture of the dopant vapor and the boron containing vapor; and

heating the mixture to produce doped boron.

2. The method of claim 1 wherein the boron containing vapor is a hydrogen and boron trichloride vapor mixture.

3. The method of claim 1 wherein the dopant vapor is titanium tetrachloride vapor.

4. The method of claim 3 wherein the boron containing vapor is a hydrogen and boron trichloride vapor mixture.

5. The method of claim 4 wherein the hydrogen and boron trichloride vapor mixture is a roughly stoichiometric mixture.

6. A method of claim 1 including the step of exposing the doped boron to magnesium vapor to convert the doped boron to doped magnesium diboride.

7. The method of claim 6 wherein the boron containing vapor is a hydrogen and boron trichloride vapor mixture.

8. The method of claim 6 wherein the dopant vapor is titanium tetrachloride vapor.

9. The method of claim 8 wherein the boron containing vapor is a hydrogen and boron trichloride vapor mixture.

10. The method of claim 9 wherein hydrogen and boron trichloride vapor mixture is a roughly stoichiometric mixture.

11. A method according to claim 1 including the step of providing in the vessel a fiber substrate for receiving the doped boron as a coating.

12. The method of claim 11 wherein the boron containing vapor is a hydrogen and boron trichloride vapor mixture.

13. The method of claim 11 wherein the dopant vapor is titanium tetrachloride vapor.

14. The method of claim 13 wherein the boron containing vapor is a hydrogen and boron trichloride vapor mixture.

15. A superconductor comprising doped magnesium diboride formed by heating a mixture of a boron containing vapor and a dopant vapor to produce doped boron and exposing the doped boron to a magnesium vapor.

16. A superconductor according to claim 15 wherein the boron containing vapor is a hydrogen and boron trichloride vapor mixture.

17. A superconductor according to claim 15 wherein the dopant vapor is titanium tetrachloride vapor.

18. A superconductor according to claim 17 wherein the boron containing vapor is a hydrogen and boron trichloride vapor mixture.

19. A superconductor according to claim 18 wherein the hydrogen and boron trichloride vapor mixture is a roughly stoichiometric mixture.

20. A superconductor according to claim 15 wherein the doped boron is a coating on a fiber substrate.

21. A superconductor according to claim 20 wherein the boron containing vapor is a hydrogen and boron trichloride vapor mixture.

22. A superconductor according to claim 20 wherein the dopant vapor is titanium tetrachloride vapor.

23. A superconductor according to claim 21 wherein the dopant vapor is titanium tetrachloride vapor.

24. A superconductor according to claim 23 wherein the hydrogen and boron trichloride vapor mixture is a roughly stoichiometric mixture.

25. A superconductor according to claim 20 wherein the fiber substrate is a silicon carbide substrate.

26. A superconductor according to claim 25 wherein the boron containing vapor is a hydrogen and boron trichloride vapor mixture.

27. A superconductor according to claim 25 wherein the dopant vapor is titanium tetrachloride vapor.

28. A superconductor according to claim 27 wherein the boron containing vapor is a hydrogen and boron trichloride vapor mixture.

29. A superconductor according to claim 28 wherein the hydrogen and boron trichloride vapor mixture is a roughly stoichiometric mixture.

30. A superconductor comprising a fiber substrate coated with magnesium diboride doped with a titanium compound.

31. A superconductor according to claim 30 wherein the fiber substrate is a silicon carbide substrate.